



# Black Bear and Deer analysis

## Green-Horse Habitat Restoration & Maintenance Project

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Shasta Trinity National Forest  
National Recreation Area Management Unit  
Shasta County, California



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The **Green-Horse Habitat Restoration and Maintenance Project** (Green-Horse project) was analyzed for its effects on deer and black bear from the proposed activities, in response to comments and concerns conveyed by the public during the comment period.

## Summary

Within the Green-Horse project area, early-seral brush habitat on National Forest lands serves as browse for numerous species such as black-tailed deer and black bear in addition to prey species that support a wide variety of wildlife. These areas provide cover and forage when the habitat is in a well-maintained condition, with a mosaic of new growth for forage intermixed with older patches which serve as cover and potential fawning and bedding areas for deer, and forage and cover for black bear.

## Existing Condition

Overall, coniferous and hardwood forest types occur over the majority of the project area with areas of brush and chaparral. Understory vegetation in conifer and hardwood forest stands consists of shrubs, perennial and annual forbs and grasses. Understory herbaceous species are discussed in more detail in the Green-Horse Botany Report. According to the watershed assessment for the Pit Arm watershed of Shasta Lake (where a large portion of the project area is located), approximately two thirds (67%) of existing chaparral in the watershed is over 60 years old; the remaining chaparral stands are 6 to 12 years old<sup>1</sup>. Table 1 below describes the amount and proportion of browse/forage and brush species present in the project area.

In the brush-dominated vegetation within the project area, essentially a single layer of dense brush has formed a nearly continuous cover. Occasional individual or small groups of 3-5 trees, typically California black oak or grey pine may grow in the brush but trees make up a minor component of brush vegetation types. Without disturbance, these dense brush fields have grown increasingly decadent over time and become interspersed with skeletons of dead brush<sup>2</sup>.

In brush type vegetation communities such as lower montane mixed chaparral (the prevalent brush community within the project area), densification leads to increased decadence as observed by a preponderance of older woody growth with interspersed dead branches, very little new growth and accumulations of dead leaves and twigs on the ground. Brush communities in the project area have persisted in this condition, with little to no natural disturbance, creating an increasing accumulation of dead leaves, branches and brush skeletons interspersed with live growth.

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<sup>1</sup> Pit Arm Watershed Analysis 2010

<sup>2</sup> Green-Horse Project Vegetation Report

**Table 1:** Deer and bear habitat as represented by browse, forage and brush cover species: a subset of the Regional dominance type vegetation classification proposed for treatment in the project area.\* Table1 below is a subset of larger table within the Green-Horse Vegetation Report.

Regional dominance type symbol	Alliance name	Acres	Percentage of project area
<b>Hardwood Forest/Woodland</b>			
QC	Canyon Live Oak	4,328	10%
QK	Black Oak	8,117	19%
<b>Total Hardwood Forest/Woodland</b>		<b>12,445</b>	<b>30%</b>
<b>Shrubs and Chaparral</b>			
CJ	Brewer Oak	245	1
CS	Scrub Oak	133	<1
CW	Whiteleaf Manzanita	225	1
CQ	Lower Montane Mixed Chaparral	3,390	8
CX	Upper Montane Mixed Chaparral	29	<1
<b>Total Shrubs and Chaparral</b>		<b>4,022</b>	<b>10%</b>
<b>Herbaceous</b>			
HG	Annual Grasses and Forbs	13	<1
<b>Total Herbaceous</b>		<b>13</b>	<b>&lt;1%</b>

\* Categories above represent the Regional Dominance types pertinent to the analysis of deer and black bear within the project area. The remaining categories are described in detail in the Green-Horse Vegetation Report.

**Table 2:** Treatment acres in Wildlife Habitat Management prescription for each action alternative; Alternative 2 proposes an additional 170 acres of prescribed burning in management prescription VI than Alternative 3. Alternative 2 has 28,378 more treatment acres than Alternative 3.

<b>ALTERNATIVE 2</b>			
Forest Plan Management Prescription	Prescribed Fire: broadcast burn or underburn (acres)	Hand Treatment: thin/prune/pile/burn piles (acres)	Dozer Lines (miles)
Wildlife Habitat Management (VI)	5,778	21	0
All Management Prescriptions	41,625	208	4
<b>ALTERNATIVE 3</b>			
Wildlife Habitat Management (VI)	5,608	21	0
All Management Prescriptions	13,247	28	0

### ***Black-tailed deer***

The majority of the project area serves as winter range for the Columbian black-tailed deer, which migrate down from the surrounding higher elevations when snow begins to accumulate. Nearly all the land surface of the project area is below 3,000 feet elevation, and normally relatively snow free. Important winter range is located on most of the south-facing slopes. The herds utilize the area as a migratory travel route, from winter to summer ranges. The area receives moderate year-round use, receiving the highest use when mast crops are plentiful and as winter range.

The shrub lands, hardwood stands, and hardwood/conifer mixed stands in the project area currently provide a moderate to high level of forage and cover for deer. In areas with previous fuels management (i.e. mastication and/or prescribed fire), browse condition is of higher quality than in untreated areas, where brush has become unpalatable due to decadence<sup>3</sup>.

Fire exclusion has resulted in reduced palatability of browse for deer, while increasing the occurrence and future likelihood of large-scale high-severity fires. While such fires may increase the availability of browse habitat, they reduce the occurrence of effective cover for deer and other wildlife. Site quality and soil productivity, which directly affect the quality of browse habitat, are at risk from future high-severity fires.

### ***Black bear***

Black bears are common during all seasons within the project area and utilize a wide variety of habitats, with home ranges generally consisting of a relatively heterogeneous landscape. So, while brush fields with berry producing shrubs, oak woodlands with mast producing trees, and mid seral mixed conifer stands, may compose a large portion of bear habitat within the project area, they do not comprise all habitat requirements for bears. Habitats used by bears *and most likely to be affected* by the proposed project include early seral/brush fields and mid seral mixed conifer stands because it is within these areas where the understory, brush skeletons and decadent shrubs comprise the heaviest fuel loading and are therefore most likely to burn.

Recommendations within the Pit Arm watershed analysis for species associated with early seral and oak woodlands include<sup>4</sup>:

- *“Implement fuels reduction projects such as prescribed burning to enhance early-seral and oak woodland habitat. To the extent practicable, protect existing large oaks from mortality during prescribed fires.”*
- *“Improve the quality and quantity of browse and oak woodland habitats for the persistence of game species.”*

## **Effects of Alternative 1 – No Action**

### ***Black-tailed deer***

Deer have relatively smaller rumens than elk or livestock and thus must depend on a more diverse habitat consisting of a variety of plant species and plant structures. Diversity in forage choices provides

<sup>3</sup> Johnson 2009 personal communication

<sup>4</sup> Pit Arm Watershed Analysis 2010

concentrated and more digestible nutrients that are needed not only by deer, but also other herbivorous/omnivorous wildlife such as black bear.

The appropriate mix and age structure of forage species is important to quality deer habitat. Shrubs and woodland vegetation provide needed cover for deer and must be sufficiently abundant and distributed across the landscape in a way that provides adequate shelter from weather and predators.<sup>5</sup>

Older over-mature brush provides lower quality browse material for wildlife than younger more succulent brush. Old shrubs are lower in nutrition and often produce biomass that is out of reach of deer, but may provide valuable hiding and thermal cover. However, too much woody cover suppresses amount and diversity of valuable understory herbaceous forage.

Within the early seral brush and browse habitats within the project area, a lack of fire will continue to reduce the amount of deer browse available in the understory in the form of mast, herbaceous growth or early seral shrubs/browse. Herbaceous growth will be outcompeted by the growth of shrubs and oak seedlings. Shrub species in the understory will mature and become less palatable as browse<sup>6</sup>.

In the absence of fire, surface fuels continue to accumulate from dead understory vegetation that was shaded out, dead leaves and needles, dead branches and fallen snags. These accumulated surface fuels, combined with dense live overstory vegetation create conditions that can fuel undesirable high-intensity fire with subsequent high levels of mortality and broad scale change of vegetation<sup>7</sup>. With implementation of the No Action alternative, fuel loadings and stand densities would remain high and would continue to accumulate over time barring outside disturbance events<sup>8</sup>.

According to the California Mule Deer Habitat Management Guidelines<sup>9</sup>, a lack of fire, or other management actions that can mimic a fire-like disturbance, can contribute to:

- Reduction or loss of herbaceous plants as canopy cover increases.
- Decreased reproduction and abundance of plant species important for deer as the canopy structure changes.
- Increased plant susceptibility to disease and insect infestation as woody plants become decadent.
- Reduction or elimination of disturbances that cycle nutrients and maintain early and mid-successional habitats.
- Increased age, leading to decreased palatability, nutritional quality and availability of important browse species for deer.
- Monotypic communities of similar age and structure resulting in a lack of abundant and diverse high quality forage.
- Dense stands of vegetation reduce access to areas of higher quality forage.

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<sup>5</sup> Sommer et al 2007

<sup>6</sup> USDA Forest Service 1998

<sup>7</sup> Green-Horse Vegetation Report 2012

<sup>8</sup> Green-Horse Vegetation Report 2012

<sup>9</sup> Sommer et al 2007

### ***Black bear***

As described above for deer, a mosaic of habitat types is also important for bears. Because bears will eat a wide variety of foods and choose these foods depending on the season, it is necessary to maintain this mosaic of forage, juxtaposed with suitable cover. Natural disturbance in an ecosystem can result in this variety of habitats in different vegetative successional stages and patterns. Without this disturbance, the diversity and abundance of forage is reduced.<sup>10</sup>

## **Effects of Alternative 2 – Proposed Action**

### ***Black-tailed deer***

Deer are primarily browsers, with a majority of their diet comprised of leaves and twigs of woody shrubs, with a smaller proportion made up of broad-leafed herbaceous plants. As described above, deer digestive tracts differ from cattle and elk in that they have a smaller rumen in relation to their body size and so they must be more selective in their feeding. Instead of eating large quantities of low quality feed like grass, deer must select the more nutritious plants and plant parts.

The use of well-planned prescribed fire and/or mechanical treatment in chaparral to create early successional, high-quality browse in close proximity to cover can provide substantial benefits to deer<sup>11</sup>. The following table describes the benefits from prescribed burning, or low to moderate intensity natural fire, to deer and deer habitat as described within the California Mule Deer Habitat Management Guidelines. Changes in vegetation composition and structure after a fire influence how deer populations respond to post-fire landscapes.

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<sup>10</sup> Lyons et al 2003

<sup>11</sup> Sommer et al. 2007

**Table 3:** Benefits of prescribed burning or low to moderate intensity natural fire to deer and deer habitat<sup>12</sup>.

<b>FOOD</b>	<ul style="list-style-type: none"> <li>✓ Improves nutrient cycling</li> <li>✓ Increases nutrient value of plant species</li> <li>✓ Increases palatability of forages</li> <li>✓ Removes dense, rank, or over mature growth</li> <li>✓ Stimulates crown or root sprouting</li> <li>✓ Provides for early successional species and communities</li> <li>✓ Reduces un-decomposed organic materials and litter that inhibit growth of grasses and forbs</li> </ul>	<ul style="list-style-type: none"> <li>✓ Creates a mosaic of different successional stages</li> <li>✓ Encourages early spring green-up of grasses and forbs</li> <li>✓ Eliminates undesirable plant species</li> <li>✓ Stimulates seed germination</li> </ul>
<b>COVER</b>	<ul style="list-style-type: none"> <li>✓ Creates/maintains appropriate cover levels</li> <li>✓ Produces temporary openings</li> <li>✓ Creates edge</li> <li>✓ Modifications of use patterns by deer</li> <li>✓ Provides control of young invasive undesirable woody plants</li> </ul>	<ul style="list-style-type: none"> <li>✓ Improves detection of predators</li> <li>✓ Improves fawning cover through the promotion of seed germination and growth of perennial bunchgrasses (fawning cover)</li> </ul>
<b>WATER</b>	<ul style="list-style-type: none"> <li>✓ Improves water yield</li> <li>✓ Increases spring recharge</li> </ul>	<ul style="list-style-type: none"> <li>✓ Improves water infiltration, retention, and deep percolation (through increased ground cover)</li> </ul>

The influence of fire in woodland chaparral on important deer habitat components is varied and is closely linked to quantity, quality, and diversity of food plants necessary for successful reproduction and survival of deer populations<sup>13</sup>. In mature or late seral stage chaparral communities, browse quality, quantity, availability, and diversity are primary limiting factors during much of the year<sup>14</sup>. A diverse mix of woody plants, forbs, and grasses in an early to intermediate seral stage provide deer with highly nutritious and palatable forage. Past research has shown that deer thrive on early successional vegetation that comes 1-10 years after a fire<sup>15</sup>.

Availability of diverse, high quality forage provides deer the opportunity to obtain year-round dietary requirements of protein, carbohydrates, crude fat, vitamins, and minerals. Fire can be an effective tool for returning early successional stages to fire adapted vegetative communities<sup>16</sup>.

<sup>12</sup> Sommer et al. 2007

<sup>13</sup> Ibid

<sup>14</sup> Sommer et al 2007; Biswell 1989

<sup>15</sup> Sommer et al 2007

<sup>16</sup> Biswell 1989; Agee 1993; Sommer et al 2007

### ***Black bear***

Within treated areas, habitat for bears will improve as new growth of berry producing shrubs and increased ease of maneuverability result from treatments. Older, decadent brush and understory will be removed and replaced by new growth and a mosaic of openings juxtaposed with areas of cover.

Very little impact is expected from proposed treatments to other bear habitats such as riparian corridors, caves and rocky outcroppings, and mature oak woodlands, where the general lack of fuel and/or the lack of proposed treatment will preclude any meaningful impacts to bear habitat. In drier vegetative communities, such as the project area, riparian habitat is some of the most essential habitat for bears<sup>17</sup>. Very little impact to this habitat type is expected.

Because the mosaic of openings and cover is more important to black bears than individual habitat classes, maintenance of this mosaic is of the most benefit to bears<sup>18</sup>. This mosaic of vegetation can be maintained through prescribed burning, as proposed by this alternative.

Human disturbance in the area during project implementation may cause any bears occupying the area to be temporarily displaced to areas of less disturbance; though the magnitude of this disturbance is unlikely to be of any consequence as bears are highly mobile and tend to regularly distance themselves from most human disturbance regardless of the activity.

### **Effects of Alternative 3**

Total acres of prescribed burning and hand treatment are reduced in Alternative 3, as the Forest Plan amendment that would facilitate these actions would not be completed. Alternative 3 proposes 13,247 acres of prescribed burning, a difference of 28,378 acres as compared to the Proposed Action. In addition, there would be no dozer line construction with Alternative 3; only handline and natural barriers and ridges would be used.

Indirect impacts resulting from a lack of treatment to deer and bear habitat could result in the eventual loss of that habitat from high intensity wildfire. The exact amount of habitat affected by this alternative is difficult to assess because we do not know the *specific* areas used by deer and/or bear within the project area. In analyzing indirect effects of Alternative 3, we cannot establish all areas used by deer and bear that will go *untreated* with this alternative and subsequently provide an analysis of meaningful impacts from this *lack* of treatment. It can be assumed, based on the fire and fuels modeling described above, that areas of suitable habitat not treated prior to a high intensity wildfire event would be at high risk of loss during that event. In addition, as described above, untreated acres of foraging habitat would continue to age more closer to senescence, thereby becoming less palatable and providing lower quality habitat than areas treated with prescribed burning. It would then follow that Alternative 3, with its reduced acres of underburning, would have fewer beneficial effects to the deer and bear habitat in the project area.

As described above, it is the mosaic of openings and cover that is most important to black bears rather than individual habitat classes; maintenance of this mosaic is of the most benefit to bears<sup>19</sup>. This mosaic of vegetation can be maintained through prescribed burning, as proposed by both action alternatives.

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<sup>17</sup> Lyons et al. 2003

<sup>18</sup> Lyons et al. 2003



It is unknown whether bears and/or deer are more disturbed by noise from heavy equipment versus sounds generated by humans during hand line construction. No dozer line construction would occur with Alternative 3, so if heavy equipment does cause increased agitation, then disturbance from Alternative 3 during line construction would be reduced as compared to Alternative 2.

## Literature Cited

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<sup>19</sup> Lyons et al. 2003